In the Claims:

1. (Currently Amended) A method of continuously etching a multi-layer film, comprising the steps of:

storing a target etch depth for each layer of a plurality of layers of said multi-layer film;

determining the value of a selected optical characteristic for an initial layer of said plurality of layers;

etching a layer of said plurality of layers according to selected etching parameters, said etching of each layer further comprising;

(a) determining a plurality of values for said selected optical ~~characteristics each~~ characteristic associated with each one of said plurality of layers ~~and determined during said etching of said associated one of said plurality of layers~~ undergoing said etching,; ~~and~~

(b) calculating in real time the ~~determining~~ dynamic etch progressions ~~each~~ based on ~~one of~~ said plurality of values associated with said layer ~~optical characteristics that is associated with a particular one of said plurality of layers~~ undergoing said etching,

(c) determining if one of said dynamic etch progressions is the same as said target etch depth for said layer undergoing said etching, and

(d) repeating steps (b) and (c) until said target etch depth and said dynamic etch progressions are the same;

determining the value of a selected optical characteristic for another layer of said

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plurality of layers; and

repeating said etching step for said another layer.

2. (Currently Amended) The method as recited in Claim 1 further comprising comparing said optical characteristics during the etching of a selected layer to detect differences therein and dynamically adjusting said etching parameters according to said differences.

3. (Currently Amended) The method as recited in Claim 1 wherein at least two of said plurality of said optical characteristics of at least two of said layers are substantially similar.

4. (Currently Amended) The method as recited in Claim 1 further comprising determining a plurality of refractive indices, one each associated with one of said plurality of layers, and wherein ~~each of~~ said dynamic etch progressions for each layer of said plurality of layers is ~~further~~ based on one of said plurality of refractive indices that is associated with said particular one layer of said plurality of layers undergoing said etching.

5. (Currently Amended) The method as recited in Claim 1 wherein said step of calculating ~~determining said~~ dynamic etch progressions is further based on an elapsed etch time.

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6. (Currently Amended) The method as recited in Claim 1 wherein said etching includes a process [[one]]selected from the group consisting of:

dry plasma etching;

chemical-vapor-deposition;

sputter deposition;

thermal deposition;

evaporation; and

physical vapor transport.

7. (Original) The method as recited in Claim 1 wherein said plurality of layers includes at least three layers.

8. (Original) The method as recited in Claim 1 wherein at least one of said plurality of layers comprises one selected from the group consisting of:

fluorosilicate glass;

undoped silicon glass;

phosphosilicate glass; and

silicon nitride.

9. (Currently Amended) The method as recited in Claim 1 wherein said step of determining a plurality of values for said ~~plurality of~~ selected optical characteristic ~~characteristics~~ includes collecting interference signals reflected from said particular one of said plurality of layers undergoing said etching.

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10. (Currently Amended) The method as recited in Claim 9 wherein said step of determining a plurality of values for said ~~plurality of~~ selected optical characteristic ~~characteristics~~ includes analyzing said interference signals to determine a frequency of said associated one of said plurality of layers.

11. (Original) The method as recited in Claim 10 wherein said analyzing includes performing a Fast Fourier Transform.

12. (Original) The method as recited in Claim 1 wherein said etching removes portions of said plurality of layers.

13. (Currently Amended) A method of manufacturing a microelectronic device, comprising:

providing a substrate having a first layer located on a surface thereof and a second layer located on said first layer;

storing a first target etch depth for said first layer and a second target etch depth for said second layer;

determining a first etch rate for said first layer by identifying a first optical characteristic of said first layer by interferometry;

etching said first layer to a first target etch depth based on said first etch rate;

determining a second etch rate for said second layer by identifying a ~~second~~ optical characteristic of said second layer by interferometry; and

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etching said second layer to said [[a]]second target etch depth based on said second etch rate.

14. (Original) The method as recited in Claim 13 wherein said etching to said first target etch depth continues until said second optical characteristic is identified, at which time said etching to said second target etch depth begins.

15. (Original) The method as recited in Claim 13 wherein said first target etch depth is further based on a first refractive index of said first layer and wherein said second target etch depth is further based on a second refractive index of said second layer.

16. (Original) The method as recited in Claim 13 wherein said first target etch depth is further based on a first elapsed etch time and wherein said second target etch depth is further based on a second elapsed etch time.

17. (Currently Amended) The method as recited in Claim 13 wherein at least one of said etching to said first and second target etch depths includes a process [[one]]selected from the group consisting of:

dry plasma etching;

chemical-vapor-deposition;

sputter deposition;

thermal deposition;

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evaporation; and

physical vapor transport.

18. (Original) The method as recited in Claim 13 wherein at least one of said first and second layers comprises one selected from the group consisting of:

fluorosilicate glass;

undoped silicon glass;

phosphosilicate glass; and

silicon nitride.

19. (Original) The method as recited in Claim 13 wherein said identifying said first optical characteristic includes collecting first interference signals reflected from said first layer during said etching to said first target etch depth and wherein said identifying said second optical characteristic includes collecting second interference signals reflected from said second layer during said etching to said second target etch depth.

20. (Original) The method as recited in Claim 19 wherein said first optical characteristic is a first frequency determined by analyzing said first interference signals and said second optical characteristic is a second frequency determined by analyzing said second interference signals.

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21. (Original) The method as recited in Claim 20 wherein at least one of said analyzing said first and second interference signals includes performing a Fast Fourier Transform.

22. (Cancel)

23. (Currently Amended) A method of manufacturing a microelectronic device comprising:

providing a substrate with a first layer located on a surface thereof and having a first optical characteristic and a second layer having a second optical characteristic located on said first layer~~a surface of said substrate~~;

determining a first etch rate for said first layer by identifying the first optical characteristic by interferometry;

providing a control algorithm and inputting a first and second target etch depth and said first etch rate into said control algorithm;

etching said first layer to [[a]]said first target etch depth based on said first etch rate;

determining a second etch rate for said second layer by identifying the second optical characteristic by interferometry; and

etching said second layer to said [[a]]second target etch depth based on said second etch rate.

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24. (Previously Presented) The method of Claim 23 wherein said etching to said first target etch depth continues until said second optical characteristic is identified, at which time said etching to said second target etch depth begins.

25. (Previously Presented) The method of Claim 23 wherein said first target etch depth is further based on a first refractive index of said layer and wherein said second target etch depth is further based on a second refractive index of said layer.

26. (New) A method of continuously processing a multi-layer film, comprising the steps of:

storing a target thickness for each layer of a plurality of layers of said multi-layer film;

determining the value of a selected optical characteristic for an initial layer of said plurality of layers;

changing the thickness of a layer of said plurality of layers according to selected parameters, said changing the thickness of each layer further comprising,

(a) determining a plurality of values for said selected optical characteristic associated with each one of plurality of layers undergoing said changing of thickness,

(b) calculating in real time the dynamic thickness changing processions based on said plurality of values associated with said layer undergoing said changing of thickness,

(c) determining if one of said dynamic etch progressions is the same as said target thickness for said layer undergoing said changing of thickness, and

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(d) repeating steps (b) and (c) until said target thickness and said dynamic changing of thickness progressions are the same;

determining the value of a selected optical characteristic for another layer of said plurality of layers; and

repeating said changing the thickness step for said another layer.

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